UNITED STATES PATENT AND TRADEMARK OFFICE

KH

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,692	06/16/2005	Miroslav Trajkovic	PHUS020626	6550

24737 7590 10/09/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
RICE, ELISA M	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
10/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,692	TRAJKOVIC ET AL.	
	Examiner	Art Unit	
	Elisa M. Rice	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/16/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a quotation of 37 CFR 1.75(a):

> The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

Claim 1 is objected to under 37 CFR 1.75(a), as failing to particularly point out and distinctly claim the subject matter which application regards as his invention or discovery.

Regarding claim 1, claim 1 is not clear in relation to which other entity the "new similarity index" is considered as "higher". For purposes of examination, Examiner assumes that the entity is the similarity index of previous iterations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Calia (5,450,504) and Kuperstein et al. (US 6,128, 398).

Regarding claims 1 and 9, Calia discloses a method of comparing a captured image to stored images to find a match, comprising:

retrieving a captured image ("In the system a computer receives as digitized data a video scanned target image of a person. The computer operates on the digitized image data,"Calia, column 2, line 46-49);

for I=1 to X ("Preferably 6 features are used. More or less may be used but it has been found that 6 is an optimal number.", Calia, column 4, line 45-46)

take a sample of pixels of the captured image ("Calia, column 4, line 42-48);

perform comparison between the samples of the pixels of the captured image to corresponding samples of pixels of the stored images ("Correlation scoring is a measure of similarity between two images. The correlation score is arrived at by a pixel by pixel comparison of the target and data base image portions in the scoring window.", Calia, column 9, lines 58-60, " A first correlation score called a composite score, S1, is defined which comprises the portion of the face from just above the eyes to just below the mouth, that is, the entire scoring box. A second correlation score S2 is defined which comprises the eyes only. A third correlation score S3 is defined which comprises the

nose area only. A fourth correlation score S4 is defined which comprises the mouth area only", Cala, column 10, lines 7-15);

calculate a new similarity index for the random sample of the captured image and replace the similarity index if new similarity index is higher(Fig. 16, "Create Results File"); increment I ("A second correlation score S2 is defined which comprises the eyes only.", column 10, lines 7-15) and determine if the similarity index is above a predetermined threshold for a match (Fig. 16, "Results > T1 Threshold, "The threshold is a correlation score at or above which a match is to be declared.", Calia, column 11, line 26-28). In Calia, the default similarity index is inherently zero, since the similarity score is set to the first feature score.

Calia doesn't disclose:

1) using random samples

Kuperstein teaches using random samples (Kuperstein, Fig. 6, numeral 94).

It would have been obvious to one of ordinary skill in the art to modify the facial recognition system of Calia to include the random samples of Kuperstein so that as Kuperstein states in column 13, lines 11-14 "if a fraudulent user then puts his picture on the card the random sample of the image will be scanned and it will be noted that they are different from the ones in the database and the card will be rejected"

Claims 2-4 ,10-12, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calia (US 5,450,504), Kuperstein et al. (US 6,128, 398) and Guo et al.(6,353, 678 B1).

Regarding claims 2 and 10, while the combination of Kalia and Kuperstein disclose the method as claimed in claim 1, the combination of Kalia and Kuperstein does not disclose wherein a robust algorithm is used which samples the image and performs face recognition by substantially removing outliers from having an impact on the comparison results.

Guo teaches wherein a robust algorithm is used which samples the image and performs face recognition by substantially removing outliers from having an impact on the comparison results (Guo, column 8, line 47-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to use a robust algorithm that removes outliers as taught by Guo for the "selection of good correspondences" as stated by Guo in column 8, line 45-46.

Regarding claims 3 and 11, while the combination of Kalia, Kuperstein, and Guo disclose the method as claimed in claim 2, the combination of Kalia, Kuperstein, and Guo does not disclose wherein the algorithm is the RANSAC algorithm.

Guo teaches wherein a robust algorithm is used which samples the image and performs face recognition by substantially removing outliers from having an impact on the comparison results (Guo, column 8, line 55-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to use the RANSAC algorithm so that "correspondences having an error greater than the median error are rejected as outliers" (Guo, column 8, line 66-67)."

Regarding claims 4 and 12, the combination of Kalia, Kuperstein, and Guo discloses the method as claimed in claim 2, the combination of Kalia, Kuperstein, and Guo does not disclose wherein the algorithm is the least medium of squares algorithm.

Guo teaches wherein the algorithm is the least medium of squares algorithm (Guo, column 8, line 49).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to use the least medium of squares algorithm as taught by Guo "to separate the good correspondences (inliers) from the bad correspondences (outliers)." (Guo, column 8, line 49-51)."

Regarding claim 17 and 19, Calia discloses a method of comparing images, comprising:

selecting a sample of pixels ("Calia, column 4, line 42-48) from a captured image (Calia, column 2, line 46-49)

computing a similarity index ("Correlation scoring is a measure of similarity between two images. The correlation score is arrived at by a pixel by pixel comparison of the target and data base image portions in the scoring window. ",Calia, column 9, lines 58-60, "A first correlation score called a composite score, S1, is defined which comprises the portion of the face from just above the eyes to just below the mouth, that is, the entire scoring box. A second correlation score S2 is defined which comprises the eyes only. A third correlation score S3 is defined which comprises the nose area only. A fourth correlation score S4 is defined which comprises the mouth area only", Cala, column 10, lines 7-15);

and determining if there is a match between the captured image and the stored image (Fig. 16, "Create Results File") and determine if the similarity index is above a predetermined threshold for a match (Fig. 16, "Results > T1 Threshold, "The threshold is a correlation score at or above which a match is to be declared.", Calia, column 11, line 26-28).

Calia doesn't disclose:

1) performing using a robust algorithm which substantially ignores shadowed regions of the image (i.e. outliers) on the sample and the same sample in a stored image;

2) using random samples

Kuperstein teaches using random samples (Kuperstein, Fig. 6, numeral 94).

It would have been obvious to one of ordinary skill in the art to modify the facial recognition system of Calia to include the random samples of Kuperstein so that as Kuperstein states in column 13, lines 11-14 "if a fraudulent user then puts his picture on the card the random sample of the image will be scanned and it will be noted that they are different from the ones in the database and the card will be rejected"

Kuperstein does not disclose wherein a robust algorithm is used which samples the image and performs face recognition by substantially removing outliers like shadows from having an impact on the comparison results.

Guo disclose wherein a robust algorithm is used to perform facial recognition (Guo, column 8, line 66-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to use the RANSAC algorithm as taught by Guo so that "correspondences having an error greater than the median error are rejected as outliers" (Guo, column 8, line 66-67) and ""selection of good correspondences" (Guo, column 8, line 45-46).

Regarding claims 18 and 20, the combination of Calia, Kuperstein, and Guo discloses the method as claimed in claim 19, wherein the step of selecting selects a plurality of

random samples(Calia, column 4, line 45-46) and the step of performing face recognition compares the plurality of random samples with the same random samples in the stored images and computes similarity indexes (Calia, column 10, lines 7-15) and the highest similarity index (Calia, column 10, lines 7-10) is used to determine if there is a match between the captured image and the stored image(Fig. 16, "Results > T1 Threshold, "The threshold is a correlation score at or above which a match is to be declared.", Calia, column 11, line 26-28).

Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calia (US 5,450,504) and Kuperstein (US 6,128, 398), further in view of Steinberg et al. (US 6,151,073).

Regarding claims 5 and 13, while the combination of Kalia and Kuperstein discloses the method is accordance with claim 1, the combination of Kalia and Kuperstein does not disclose wherein a weighted sample is used which is weighted with pixels which have a low likelihood of being affected by light.

Steinberg teaches wherein a weighted sample is used which is weighted with pixels which have a low likelihood of being affected by light (Sternberg, column 8, line 43-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to use the light-weighted samples as taught by Steinberg in order to "weigh it as more important" ("a

particular area of the image can be over sampled in order to weigh it as more important", Steinberg, column 8, line 52-53).

Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calia (US 5,450,504) and Kuperstein (US 6,128, 398), further in view of Buzuloiu et al. (US 6,751,348).

Regarding claims 6 and 14, while the combination of Kalia and Kuperstein discloses the method in accordance with claim 1, the combination of Kalia and Kuperstein does not disclose wherein the step of determining occurs before the step of incrementing I, and if there is a match then additional random samples do not need to be taken and compared.

Buzuloiu teaches wherein the step of determining occurs before the step of incrementing I, and if there is a match then additional random samples do not need to be taken and compared (Fig. 4, 130).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to determine whether the threshold has been met before incrementing as taught by Buzuloiu in order to avoid running through any remaining samples if a suitable match is already available.

Claims 7, 8,15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calia (US 5,450,504) and Kuperstein (US 6,128, 398), further in view of Huttenlocher et al. (US 5,416,851).

Regarding claims 7 and 15, while the combination of Kalia and Kuperstein discloses the method in accordance with claim 1, the combination of Kalia and Kuperstein does not disclose wherein the value of X is based on desired accuracy.

Huttenlocher teaches wherein the value of X is based on desired accuracy (Huttenlocher, column 2, line 17-21).

It It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to base the number of samples on the desired accuracy as taught by Huttenlocher because "if the variance is known or can be estimated, statistical sampling theory can be rigorously applied to determine the number of samples required, with more samples being required if the variance is higher (Huttenlocher, column 2, line 35-39)."

Regarding claims 8 and 16, while the combination of Kalia and Kuperstein discloses the method in accordance with claim 1, the combination of Kalia and Kuperstein wherein the value of X is based on computing requirements.

Huttenlocher teaches wherein the value of X is based on computing requirements (Huttenlocher, column 20, line 52-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of the combination of Kalia and Kuperstein to base the number of samples on computing requirements as taught by Huttenlocher because "a typical image includes a very large number of pixels, so that this approach is computationally expensive." (Huttenlocher, column 1, lines 38-40).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elisa M. Rice whose telephone number is (571)270-1582. The examiner can normally be reached on 8:00a.m.-5:30p.m. EST Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571)272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Elisa Rice ER 10/1/2007
Patent Examiner
2624

EMR

BRIAN WERNER
SUPERVISORY PATENT EXAMINER